REMARKS

The following is responsive to the mentioned office action.

As is believed clear from the record, claim 36 was previously cancelled because its limitations were added to other claims in this application in view of the prior, correct allowance of this claim over all the prior art. In this regard, the examiner is referred to MPEP § 706.04 stating: "Full faith and credit should be given to the search and action of a previous examiner unless there is a clear error in the previous action or knowledge of other prior art," and noting that "it is unusual to reject a previously allowed claim." Nevertheless, applicants are happy to clarify patentability once again.

In order to place the invention of this application in its proper perspective, applicants refer to the reply filed on April 14, 1997. A review of private PAIR indicates that this reply is available to the examiner electronically. However, of course, if the paper or any of its attachments are missing, the undersigned will be happy to provide copies.

Pages 11-13 of that reply and the attached evidence, firmly establish the following facts, among other things:

1. Prior to the making of this invention, LCD displays were not able to replace CRTs for applications such as desktop monitors because they were unable to achieve viewing angle independency "equivalent to that of CRTs," which of course, also is a prerequisite for application of LCD's in TV's. See, e.g., page 3, lines 25-30 of the specification. As the evidence filed with the reply firmly established, the problem "proved vexing and extremely difficult to resolve with conventional technology. There was no obvious approach."

2. Of course, as the examiner has established, liquid crystal displays per se have been around for a long time, at least as early as 1974, the timeframe of the Soref references, but, of course, even much earlier. Thus, unambiguously, there was a long felt need in the LCD display field for a solution to the viewing angle problem (whereby good contrast was achieved for perpendicular viewing of an LCD display but as a viewer changed his/her viewing angle with respect to the surface of the display, the display contrast deteriorated quickly).

3. The evidence attached to the same reply also firmly establishes that the invention of this application provided a solution to this problem for which "[T]there was no obvious approach." This evidence is in the form of various highly prestigious awards given in the LCD field to the invention claimed in this application. (In these awards, the invention is referred to as "in plane switching (IPS)," or "super TFT Technology [IPS]" etc. These terms are art terms referring to the claimed invention which recites such in plane switching (switching under control of an electric field having a component predominantly parallel to the surface of the display). The examiner is referred to the evidence itself for descriptions of the awards, as well as pages 11-13 of the reply. It will be noted there that the invention of this application has been described by the LCD field using terms such as "a major change in TFT-LCD panel architecture," "impressive technology," "a veritable star of the show," possessing "impressive characteristics," etc. Clearly, the invention of this application was met by workers in the field with enthusiastic praise and recognition of the major, non-obvious advancement in the art which it provided. This is the clearest form of proof of "unexpected results."

Furthermore, in addition to the various alleged facts to which the examiner gives "official notice," he is urged to do the same with respect to the actual fact that LCDs indeed have now in essence predominantly replaced CRT monitors for desktop applications. Furthermore, they are ubiquitous in a wide variety of other display fields including thin profile TVs, laptops, etc. These facts further firmly establish the "commercial success" of this invention bearing a direct connection (nexus) to the in plane switching recitations of the claims of this application.

In other words, this is a very unusual situation where "secondary considerations" such as long felt need have unambiguously been proven by reference to commentary of skilled workers in the field. Such strong secondary considerations provide highly probative evidence of the nonobviousness of the underlying invention. See, e.g., MPEP § 716.04. Under these circumstances, as would be expected from the overwhelming evidence of nonobviousness, the only old references on which the examiner relies (the two Soref references of December, 1974) are highly unlikely to have disclosed the claimed solution to the long-standing problem of maintaining good contrast with variation of viewing angle. Had Soref in 1974 disclosed or made

obvious this solution, the field would have instantaneously adopted Soref's approach to avoid the decades long viewing angle problems possessed by all LCD displays. Thus, not surprisingly, Soref indeed does not suggest the claimed invention. As discussed below, in actuality, Soref explicitly states that his work achieved only poor viewing angle contrast properties.

The following focuses on the examiner's comments on Soref with respect to pre-tilt angle and orientation angle. Applicant's silence with respect to the various other features alleged by the examiner to be obvious in view of "official notice," is not to be taken as agreement with the examiner's assumptions.

Preliminarily, the examiner applies the two Soref December 1974 references together as applying to the same basic system. Applicants agree, since the references state this. Note the first sentence of the IEEE publication which refers to the JAP reference. The second sentence refers to investigation of certain properties of the mode of the JAP article. Moreover, the details of both references make clear that the same basic system is involved.

Furthermore with respect to the Soref references, the examiner is referred to the same prior reply of April 14, 1997, pages 15-17 for a related discussion.

Firstly, the examiner alleges that the Soref JAP publication discloses a pre-tilt angle of zero degrees. The examiner relies on the statement from page 5467 mentioning that the experiments were performed "with molecules initially oriented parallel to the plates." The examiner interprets this as specifying a pre-tilt angle of zero degrees. However, this is not true. See the first full paragraph on page 16 of the April 14, 1997, amendment. As stated there, in actuality, Soref is silent as to values of the pre-tilt angle. The quoted phrase clearly refers to the fact that the orientation of the molecules was "homogeneous," as opposed to "homeotropic." For instance, note the third sentence subsequent to the quoted phrase discussing a possible situation where "ordering is uniformly parallel (homogeneous)". This unambiguously defines the expression on which the examiner relies ("uniformly parallel") as referring to homogeneous orientation and not to the pre-tilt angle of the molecules.

That molecules in homogeneous orientation can have non-zero tilt angles (and, indeed, for the Soref experiments likely had much higher pre-tilt angles, such as greater than 30°),

reference is made to the IEEE publication. There, Soref refers to an orientation treatment in its second paragraph, i.e., 80-Å film of silicon monoxide, deposited at 85° incidence on each substrate for surface orientation. It is well-known (e.g., based on the disclosures of the Congard reference (pages 32-33 (Table VI), that such orientation treatment is likely to produce high pre-tilt angles, even greater than 30°. However, the configuration of the displays in the IEEE article is "homogeneous." See, e.g., the first two sentences of the fifth paragraph. Clearly, displays can have homogeneous alignment (termed "oriented parallel" by Soref) while having tilt angles which are non-zero. Thus, the basic assumption underlying the examiner's allegation regarding pre-tilt angles of zero degrees is incorrect. In fact, Soref et al. is silent on tilt angle in the JAP paper. It contains no motivation or suggestion whatsoever to utilize those angles recited in the claims of this application. Nor does Soref, IEEE.

Furthermore, the examiner appears be alleging that Figure 3 of the JAP article discloses orientation angles (β_0) which satisfy the requirements of the claims. Again, this is not correct. Depiction of the orientation angle in Figure 3 is of the nature of a diagram defining what the angle is. It simply shows that the angle at plate A can be different from the angle at plate B where a twist is involved. It is not meant to indicate, nor does it imply, anything about the actúal values of orientation angles used in Soref's experiments. In fact, in the second column on page 5467 of the JAP article, the orientation values are stated as being 0° or 90° - exactly the opposite of the examiner's apparent assumption.

Thus, both underpinnings for the examiner's rejection based on Soref-JAP are incorrect. Consequently, the rejection based thereon clearly is untenable.

The same conclusion also applies to the analogous rejection which adds to the JAP reference, the disclosures of the IEEE reference. Here, the examiner relies on the statement in the IEEE reference that the value of the orientation angle can be arbitrarily selected. If anything, this teaches away from the present invention where it is the non-orthogonal selection of orientation angle which, among other things, enables achievement of the unobvious and extremely significant advancement provided by the invention of this application. See, for example, Figure 7 showing the low contrast dependence with viewing angle for a display of this

invention versus that of Figure 8 showing, as the examiner has noted, a prior art display. There is very much less change with theta (viewing angle) in Figure 7 than in Figure 8. Note also the discussion above, based on evidence submitted in 1997, that the claimed invention has been recognized strongly by the experts in the field as achieving the significant unexpected result of solving a long standing problem, thus fulfilling a long-felt need in the LCD display field. That the Soref displays also did by no means whatsoever, solve the problem or even hint at a solution to it is clear from the documents themselves. See, for instance, Soref's own characterization of the viewing angle dependency of his devices: "The optical contrast ratio and the angular field-of-view are approximately the same as in the conventional twisted-nematic displays." Soref IEEE, page 1711, left col., lines 13-15. As established above, the angular field-of-view characteristics of LCD displays were poor even as of the filing date of the above-identified application, let alone at the time of Soref's publications, i.e., about twenty years earlier when TN displays were still quite young and had a long way to be improved. Clearly, none of Soref's displays achieved the properties of this invention since they admittedly had only the poor characteristics of the prior art overall. It is precisely such deficiencies that this invention dramatically and nonobviously improves, as established by the documents submitted and discussed above.

The foregoing discussion also demonstrates how claim 90 is not anticipated by Soref, JAP. As well, it shows that claims 84 and 85 are not anticipated by Soref, IEEE. Homogeneous alignment does not necessarily mean a pre-tilt angle of zero degrees, as noted above. Furthermore, again as noted above, Soref IEEE in essence admits that its viewing angle dependency is poor. Note further that it also does not establish anticipation at least in view of the discussion concerning pre-tilt angle.

For analogous reasons, Nakanowatari also does not anticipate claim 89. Even if this reference does involve homogeneous alignment, this does not imply that it utilizes pre-tilt angles as required by the claims of this application or satisfies any other requirement either.

Applicants are in agreement with the examiner's interpretations given in paragraphs 10 and 11. With respect to the latter paragraph, the two mentioned direct triggering embodiments are among others which are possible.

It is respectfully submitted that there is nothing indefinite about claim 89. As firmly established below, prior to the filing of this application, all prior art devices lacked the viewing angle dependency characteristics of the current invention. In fact, such characteristics were so poor in the prior art that they prevented LCD displays from having the dominant position that they have now, which position has been enabled by the current invention. Thus, the particular words to which the examiner refers can be understood in comparison to any prior art device with no resultant indefiniteness as to what is included in the claims and what is excluded therefrom.

With respect to claim 88, reference is made to the top of page 15 of the amendment of April 14, 1997. Therein is mentioned a mark-up of Figure 7 demonstrating the inherency of the recited feature on which the examiner *comments*. Another copy of the mark-up is being provided herewith. Note the reference to the *VasCath* case mentioned on page 15.

The Commissioner is hereby authorized to charge any fees associated with this response or credit any overpayment to Deposit Account No. 13-3402.

Respectfully submitted,

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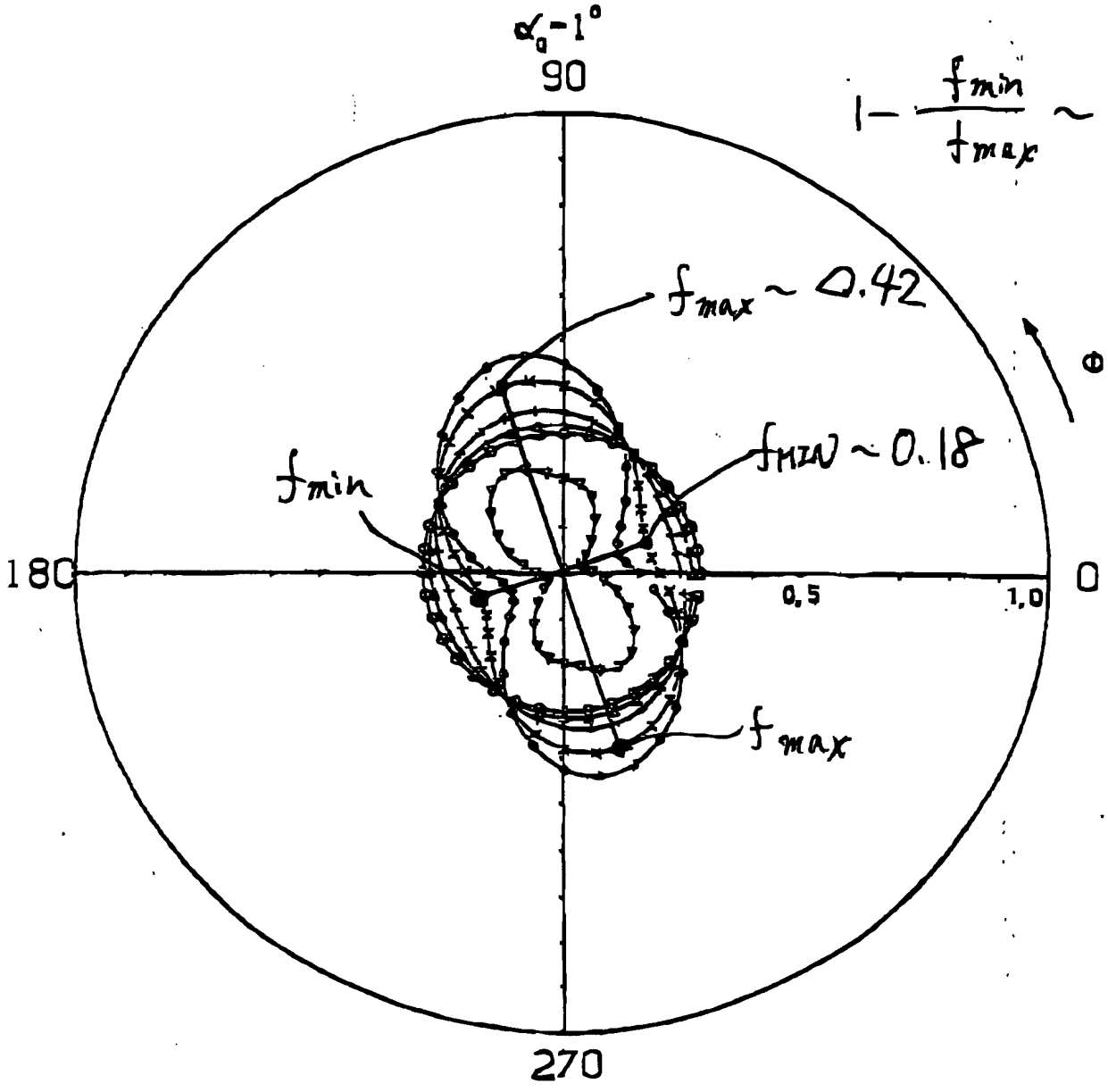
FIG. 7

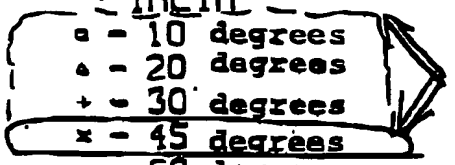
TRANSMISSION = f(θ, Φ)



$1 - \frac{f_{min}}{f_{max}} \sim 0.57$

$n_0 = 1.5595, d = 8.0\mu, \lambda = 550nm$
Pol/An = 0°/90°, $n_0 = 1.50$

THETA
□ = 10 degrees
△ = 20 degrees
+ = 30 degrees
× = 45 degrees
○ = 60 degrees
◇ = 80 degrees



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